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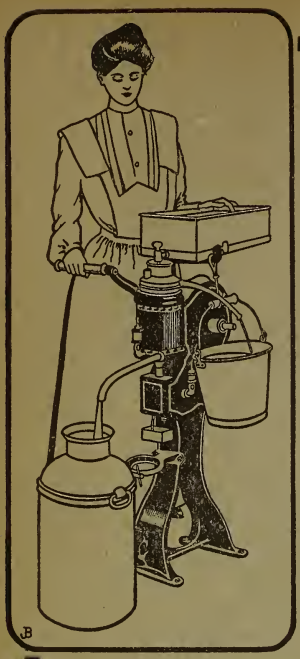

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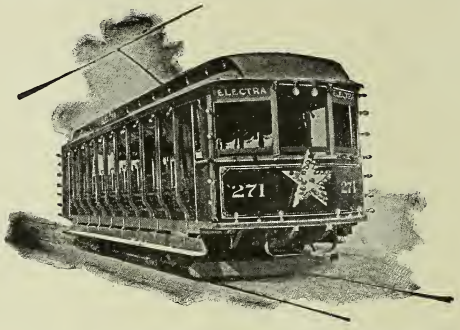

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THE AGRICULTURAL STUDENT.

VOL. XII. OHIO STATE UNIVERSITY, COLUMBUS, NOVEMBER, 1905 No. 2

TERMS OF SUBSCRIPTION:

One Year	$0.50
One-half Year	.30
Single Copies	.05

While this magazine is published with the approval of the President of the University and the Officers of the College of Agriculture and Domestic Science, the editors are responsible for the statements in all unsigned articles.

Address all communications to the Business Manager, Agricultural Student, Columbus, Ohio.

Entered at the Post-Office, Columbus, Ohio, as second-class matter.

PUBLISHED MONTHLY BY

THE AGRICULTURAL STUDENT PUBLISHING COMPANY.

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EDITORIAL COMMENT

It is a principle of economics that the wants of a normal man constantly run ahead of his ability to satisfy them; that as one want is satisfied another arises, and so on. The wants of the savage are less than those of the nomad, and those of the nomad less than those of the civilized man. Dissatisfaction then increases directly with civilization and therefore becomes a virtue. Now let us apply this. How many farmers are there today who are thoroughly satisfied with a yield of thirty bushels of corn per acre, twelve of wheat or fifty of potatoes when with a little extra effort and a knowledge of some of the scientific laws this amount could easily be doubled. How extremely low this class of people must be regarded under the heading of civilization. The above yield would keep body and soul together; it would provide for the three primary wants as food, clothing, shelter; it might include a few of the comforts of life as a home and public school education, but certainly not any of the luxuries, as, for example, a college education. President Thompson has reversed the saying. Education is the burden which civilization must carry,

making it read, Civilization is the burden which education must carry. Again we refer to the agricultural world.

In one of the Southern states from up on the mountain side came a young, raw-boned, mountaineer in search of a better education. He had heard about the agricultural college and its work and this was the kind of knowledge he was looking for. After five years of hard work, during which time he paid his expenses by working at odd jobs, he was graduated. Quite a change had come over the young man during this time; he had learned to dress like other people; but best of all he had learned what it was to become a respected citizen of the United States, and that he owed certain duties to his fellowman. He willingly returned to his mountain home not to take up the work where he had left off, but to begin anew, and to help his neighbors by sharing with them the knowledge which he had gained while in school. This illustration is only one of many. We need more men in our colleges and especially is this true of the agricultural college, for we believe that this institution can reach more classes of people than anv other. Let us, then, do what we can to help the cause along, and let us see to it that the work of the agricultural colege is understood by more of our people.

Rusia first began to be a power when she was freed from the Tartar yoke by Ivan the Great (1462-1505); and later his son Ivan the Terrible (1533-1584), the first Czar, conquered Kazan, Astracan and Siberia. After long years of civil war the crown fell to Romanoff (1613), ancestor of the present Czar; and during this reign Russia was a powerful but barbarous empire with only one seaport and no manufactures nor navy. In 1689 began the "Great Reforms" under Peter the Great but alas for Russia there were no more rulers such as he and under the following reign, that of Catherine the Great, the dismemberment of Poland took place, "the greatest crime of the eighteenth century." And so it has continued, the same old story of greed for territory and glory at the expense of freedom, until there has been added another decisive event in the world's history. We wonder if the picture drawn up by Lord Byron and relating to the rise and fall of nations is the correct portrayal of the order of the world:—

"Here lies the moral of all human tales
'Tis but the same rehearsal of the past;
First freedom and then glory; when that fails,
Wealth, vice, corruption, barbarism at last.
And history with all her volumes vast hath but one page."

"Some men are born rich, some achieve riches and some are related to presidents of insurance companies."

There are people in this world even today who, when granted special privileges, insist upon abusing them continually. Give them an inch and they will take a yard. Policy holders in our insurance companies are beginning to realize this fact and that is the reason why we hear so much talk about governmental control. There has been some action taken on this question already, but the fact remains that we have not gone far enough with it.

The Agricultural College has organized a football team with Van Voorhees, captain of last year's Denison team, as captain, and W. L. Slate, manager.

We wish to correct a statement in our last issue pertaining to one of the graduates of the class of 1905. Mr. W. H. Palmer has secured a fellowship in the Department of Animal Husbandry and is now enrolled as one of the corps of instructors in that department. He is also working out his master's degree along the same line.

How to Obtain the Heavy Harness Horse

Ohio State University,
Columbus, O., Sept. 23, 1905.

To the Editor of the Rider and Driver:

Apropos of the current discussion of the American carrige hourse, in what manner and by whom produced, it occurs to the writer that one phase of the matter has been ignored. There can be no question of the demand for heavy harness horses in this country, and that this demand is in excess of the supply is attested by the prices which qualified horses bring.

While the coach horse is preeminently the horse of fashion, in which only people of means can be interested his production should more particularly concern the agriculturalist. An intimacy with this class of men and discussion of the subject among them reveals three striking facts, namely: First, the averge farmer has very littlte idea of what constitutes a heavy-harness horse; second, he can see nothing of interest to him in a horse for which men pay $3,000 to $5,000, only to drive in the parks or win ribbons on the tan bark; and third, he has not the means to produce such a horse should be desire.

In order then to place the American carriage horse in the same relation to the farmer as is borne by the Hackney in England, the demi-sang in France, and the German horse in that country, three preliminary steps are essential. First, the farmer must be taught the market requirements for a horse of this type; second, he must be shown that, although the greater part of the price ultimately paid for these horses goes to the man wo fits and manners them, still the producer can dispose of them in the rough at a price highly renumerative to him; and third, sires must be made available to his mares.

The first two factors come more properly in the province of the agricultural press and those engaged in agricultural education. It is to the "available sires" that the thought of The Rider and Driver's readers is directed.

Is it not true that some who have been most ready to censure the government's endeavor to produce sires of the desired type and eventually place them in the breeding districts, are those in part responsible for the dearth of heavy-harness material. What could be more effective to this end than the purchase of such few sires of this sort as can be found, and their retirement to the strings as stags or stallions which are never permitted to stand for service?

Any one famaliar with the custom of the New York or Chicago dealers and who has followed the evolution of the show-horse, knows that the majority of the classes which appear before the judges in heavy leather represent the sacrifice of at least one valuable sire. The dealers cannot be criticised for their part when the producer wants to sell and the consumer is ready with the long price to buy, nor can the producer afford to do anything but sell for the price product commands, and we may further excuse the consumer for buying, since he has the price.

However, were this wanton destruction of valuable stock horses to cease and the stallions now destined to the show circuit be permitted to forego those honors to their progeny, and, instead, be distri-

buted throughout the breeding districts, there would be less occasion for the present discussion concerning the Hackney cross and the "Government mongrels."

Let those most ready to condemn the department's methods manifest their sincerity by placing the services of proper sires within the reach of farmers having suitable mares.

It is true that this has been done and without marked success but for the aforesaid reason that the farmers had not been enlightened regarding this type of horse.

Mr. Thomas W. Lawson, by arrangement with the Department of Agriculture I believe, placed his three stallions, Glorious Red Cloud, Glorious Whirling Cloud and Glorious Bonnie, representative of the three types of heavy-harness horses, in the stables of Mr. W. A. Dobson, at Marion, Iowa, to stand at a nominal fee the past season. A visit to the stable of Mr. Dobson, shortly before these horses were returned to Dreamwold, showed that their season had been very light—a fact to be deplored.

For this reason it would seem that the production of the American carriage horse in any great numbers, whether as a distinct breed or not, depends directly upon two factors: First, starting the rank and file of horse breeders aright, which is the endeavor of the colleges; and second, reserving to their use what material is already at hand. In France and Germany these conditions are met by government subsidy or ownership of approved sires, which stand for service at a reasonable fee in districts where they may be most largely patronized.

Why not carry our enthusiasm for the heavy-harness horse back from the show ring and sale stable to the source of supply? The *breed* is already established. Judicious selection and mating of individuals will evolve the distinct *type* desired.

Very truly yours,

Carl W. Gay,

Asst. Prof. Dept. Animal Husbandry.

—The Rider and Driver.

More About College Athletics

President Faunce ,of Brown, says that intercollegiate athletics are necessary to bring out the loyalty of a student body. President Elliot of Harvard, says that foot ball is not good training for "honorable, generous and efficient service to the community in after life." In an editorial on "College Spirit," President Northrop has said, "Whatever tends to strengthen college spirit in an honorable way should be encouraged. Probably no one thing tends to produce college spirit more than foot ball."

Out of thirty college presidents in the middle west, twenty-nine have condemned college athletics. They advise the abolition of foot ball entirely. One of the complaints made is that athletics, as at present conducted, induces gambling. —Minnesota Daily.

A Young Man Working His Way Through College

BY F. D. HECKATHORN.

The young man who comes to college with the intention of working and paying his own expenses certainly has a big task before him. He is acquainted with very few if any of the college men, and everything is new and strange. However, he should not be discuraged but should be given credit for trying even if he has to work his way.

In truth very few of the men who work their way through college fail to keep up their high standard after they leave school. In these men you almost invariably find good faithful students and sound, sensible men. They are fellows who claim the respect of the student body

and are men to be counted on in any undertaking or phase of college work.

The man working his way should be always on the lookout for the best paying job but should be willing to do any kind of honorable work. The fellow who does his work thoroughly and consistently during his first year does not have any trouble in securing a good job during the remainder of his college life. This is the kind of advertising that pays.

In the fall, during the nice autumn days, there are plenty of men willing to work, but when the weather begins to turn cold, they drop off until only the faithful ones are left. It is then that it takes backbone to hang on and work.

In the Agricultural college, any one who will do his work satisfactorily can get work. A few students stay over in the summer and work on the University farm at nominal farm wages. In the fall, during corn cutting, sowing of wheat, etc., all the help that can be secured is utilized. On one Saturday this autumn fotry students were employed on the farm. These men cut corn, help in the filling of the silo, husk corn, and every student receives fifteen cents an hour for all work that is done.

There are many chores to be done on the farm and this affords employment to some dozen or so men. For several years there have been on an average six milkers, three in the morning and three in the afternoon, which required about three hours per way of each man's time. One man was employed in looking after the horses, while one attended the swine and this took three hours from each man's time. Another one spent from one and one-half to two hours per day in taking care of the sheep. One or two helpers were employed in the dairy barn for feeding, etc.

The amount of money paid out for labor on the University farm during the years 1903-4 and 1904-5 is as follows:

	1903-4	1904-5
September	$551.30	$636.00
October	615.22	638.28
November	447.26	423.58
December	433.38	492.72
January	497.20	360.76
February	416.86	313.34
March	494.64	375.09
April	483.95	470.33
May	527.30	363.29
June	628.26	477.80

From the above it is readily seen that the most is paid out during early autumn and late spring when the weather is the best. This is due to two causes: First, there is much work to be done at these seasons of the year; and second, there is plenty or at least more help at this time than when the weather is bad.

In the Horticultural department there is much work to be done especially in the fall and the help employed is composed largely of students. This work consists in pruning the fruit trees, setting out and rearing of young fruit and forest trees, mulching berry bushes, sowing and reaping of cover crops, as oats, rape, millet, etc.

The raising of carrots and asparagus and their preparation for market gives employment to several. In this department there is a student assistant who has also a student helper. This work not only aids the Horticulaural students from a financial, but also from an educational standpoint sa it is right in line with their college work.

In the Dairy department there is a good chance for a young man to learn and also make some money, as three or four men are needed during the entire year. As these men often specialize in the dairy work it is the best kind of training for them. They spend about three hours each day at this work.

Some of the students work on the campus at mowing the grass, pruning bushes and trees, carting away the waste and rubbish and cleaning the lake of leaves.

A few haul water for the University buildings. Some wait table at boarding clubs, private clubs and at restaurants for their board. Others tend furnaces and mow yards for residence owners and thus defray part of their expenses.

The most of the men working their own way have taken five years to complete the regular four years' long course in agriculture. This is obviousely necessary for two reasons: First, they had no high school education and had much entrance work to make up; and second, they worked so much outside that they could not take the regular work. The men without a high school education or any other preparation generally started in on the short course in agriculture and then changed over into the long course after their first year.

In this year's Senior class in Agriculture and Horticulture and Forestry at least seven out of about twenty-five men have paid their own way while many more have paid a part of their expenses by working. It might not be amiss to cite some examples of men in this year's Senior class who have paid their own way, and we will designate them as A, B, etc.

The first year Mr. A entered school he worked on the farm at different kinds of work. In May of the first year he began bottling milk in the Dairy department and has work there up to the present time. He put in three hours each day at this work and just about paid his wya.

Mr. B came to the University farm in April and worked there all summer. When school opened he secured a job of milking and held that the first, second and one-half of the third years, spending four hours each day and receiving 15 cents an hour. After he quit working at the barn he became assistant in the soils laboratory, where he puts in twenty-five hours a week at 20 cents per hour.

Mr. C during the first year worked at odd jobs on the farm, campus and at the Horticultural farm and received 12½ cents per hour. The second and third years he fed swine, at 15 cents the second and 18 cents per hour the third year. The fourth year he fed horses and received 18 cents per hour for all work done. He averaged four hours a day.

Mr. D worked on the farm up to Christmas of his first year. Then on January 1 he became gardener for the Horticultural department and held that position for the remaining two terms of that year and the next three years in succession. He carried fifteen hours of college work and put in the rest of his each dayspare time in working as gardener which amounted to about seven hours each day. He has paid all of his expenses.

Mr. E worked at odd jobs on Saturdays during the first two terms of his first year. The third term he worked at the barn, putting in three hours each day. He spent the fall and part of the winter term of his second year in milking dairy cows, and from then up to the present time he has been drving the milk wagon which requires five hours each day of his time.

Mr. F entered school in September, 1901, with a free scholarship and $3.15 in money. He worked on the farm and campus at 12½ cents per hour, and made $50 in cash by Christmas. He carried sixteen hours college work and merited nine hours during this first term. He passed forty-four credit hours the first year and paid expenses. His second year in college he passed fifty-one hours college work and paid his way. On the 4th of January, 1902, he recured a job in the Dairy laboratory room and has remained there ever since with the exception of one summer. He has made about $1100 during the four years and is now about $75 to the good and has only forty-

eight and one-half hours to pass in order to graduate this year.

The expenses of a student at the University vary, but the average, excluding clothing, is about $225; $140.50 being the lowest and $347 being the highest. It can be readily seen that after a certain point is reached, a student can make his expenses what he wills.

Any student should be able to get along on $250. Many spend less and are really better off than those who spend more. Where there's a will there's a way, so that any student who perseveres can get an education.

A new addition to the dairy barn is being built which will give ample room for the weighing and cooling of milk before it is taken to the dairy laboratory. A room will be well equipped with lockers and other improvement for the young men working at the barn. Mr. Alex. Argo, who is superintendent of the live stock, will have his office in this new addition.

Live Stock at the Ohio State University

S. H. SHAWHAN.

The management of the whole Agricultural College has in the past been seriously handicapped from the lack of funds and it deserves great credit for bringing the department up to its present his state of efficiency, in spite of the difficulties that have been encountered. That excellent work is being done by the Animal Husbandry department is shown by the fact that the Stock Judging Team, in competition with five other agricultural colleges at the International Live Stock Exposition at Chicago, November, 1904, won the bronze trophy for superiority in judging cattle, sheep and swine. This trophy was offered by the Union Stock Yard and Transit Co., and is a fine work of art.

The purchase last summer of two high-class Clydesdale mares was a great and much needed addition to the horse department. These fillies were purchased from Brookside Farm, Ft. Wayne, Ind., and are of a beautiful bay color and a splendid type of the breed. The one, Cherry Benedict First, 10697, is a three-year old and the other Benedict's Rose, 10445, is a four-year old. The sire of these mares, Benedict, is one of the most celebrated stallions of the breed living. Last December he was taken back to Scotland for permanent service, having been originally imported to the United States from that country. The grand-dam of Benedict's Rose was one of the show animals at Broodside and was always a winner. Cherry Benedict First was bred by Robert Holloway, of Illinois. Her grand-dam, Cherry Ripe, was a very celebrated show mare, or as Mr. R. B. Ogilvie, secretary of the Clydesdale Association, says: "She was in her day the most famous showyard celebrity on this side of the Atlantic." Both of these mares were shown at the International Live Stock Exposition in 1902. They are in foal to the imported stallion at Brookside known as Gallant Curinchan.

The farm also owns a pair of high class Percheron geldings. They are jet black and weigh about 3400 pounds.

Besides these two draft teams there is a pure bred registered Cleveland Bay mare; a yearling half-bred sorrel French Coach filly that is considered a very beautiful French Coach type and two weanling colts, also half-breeds. They were sired by Apropos, the Grand Champion French Coach stallion at the Kansas City horse show in 1904. This horse was a celebrated prize winner in France and was imported by McLaughlin Bros., who now own him.

The University herd is composed of the following pure bred animals: One

Shorthorn bull and six cows, one Jersey bull and ten cows, one Red Polled bull and eight cows and five Holstein-Friesian cows, besides several steers and calves. There are also a number of grade cows and steers bringing the total up to about seventy-five head.

The head of the Shorthorn herd is Bapton Lovat, a red roan bull sired by Bapton Ensign, the head of the Ladd herd of Oregon, who was one of the most important breeding bulls of his day. Bapton Lovat is a son of the imported cow, Caroline, in the herd of W. I. Wood, Williamsport, Ohio, from whom he was purchased for the University at a cost of five hundred dollars.

Demon stands at the head of the Red Polled herd and is without question the most famous show bull of the breed living, having been shown continually from 1898 as a calf to December, 1904. He won many championships in the best rings in America. He is of the dual purpose type, tending toward beefiness, has a remarkable good back and quarter and weighs over 2000 pounds.

The Jersey bull, King's University Lad, was sired by King of St. Lambert's King, probably the most famous American bred Jersey bull living. The dam of King's University Lad is by Exile of St. Lambert, a tested cow of very superior qualities and conformation.

The dairy herd is composed of pure bred and grade cows of the different breeds, some of which have a very high individual performance. During the year 1904, covering the regular period of lactation, there were thirty-four cows milked. The best record in butter fat was made by the Jersey cow Lady Alta, who produced 6948 pounds of milk, an average of 20.4 pounds per day, and yielded 437.5 pounds of butter fat. Fourteen of the thirty-four cows produced from three hundred to four hundred pounds of butter fat, while two Jerseys each produced over four hundred pounds. Four Jersey cows each produced from 6700 to 7000 pounds of milk during the year. A grade Red Polled cow produced 8777 pounds of milk which tested 379 pounds of butter fat, a remarkable good record for a cow of this kind.

The University is at present feeding fifteen steers, including Shorthorns, Herefords, Aberdeen-Angus and Galloways, some of which are of very choice, pure breeding. It is the intention to take some of these steers to the International this fall, providing they continue to grow and fatten as they are doing at present.

In the sheep department there is a flock of eight pure bred breeding ewes, some of which were purchased from J. G. Hanmer, of Canada. A good type of ram has been recently secured to use on the flock this fall. Also there were recently purchased four yearling Cotswold breeding ewes from D. B. Watt & Son, of Xenia, Ohio. These ewes are a very choice quartet, two of which were shown at the last Ohio State fair.

There are on the farm at present about fifty head of swine, composed of pure-bred Poland-Chinas, Berkshires and Large Yorkshires.

Oowing to the lack of proper accomodations no special attempts are being made at present to develop the sheep and swine interests, but before long suitable provision will be made for them and they will then assume their proper places in keeping with the rest of the stock on the farm. It is confidently expected that at the coming session of the legislature, suitable appropriations will also be made for the erection of new cattle barns to relieve the present unsatisfactory and crowded condition.

Meeting of Columbus Horticultural Society

The October meeting of the Columbus Horticultural Society was held at the home of Mr. F. P. Vergon of Delaware.

After visiting various parts of the orchard and inspecting the methods of gathering, sorting, packing and storing the apple crop, Mr. Vergon gave the society an interesting talk on his general plan of orchard management. The main orchard was planted in 1888, or seventeen years ago. The trees were planted in a rich, blue grass sod, and has never been cultivated. The grass is mowed each year and used as a mulch around the trees. The principal varieties in the orchard are Stark, Minkler, Rome Beauty and Ben Davis.

The trees are headed low and about one-half of the apples can be picked standing on the ground.

The orchard began bearing the seventh year after planting and has not failed to produce a crop since.

This year's crop is the smallest there has been for the past eleven years, and will not be much over 3000 bushles. This partial failure is due to the unusual weather of last spring. March was nearly as warm as May, and the usual March weather came in April. When the apple trees were in full bloom a severe frost killed most of the flowers. Mr. Vergon accepts the small yield of his orchard philosophically. He says, "Blessings sometime come in disguise. I am sure the beautiful March weather, while unfavorable in that it prematurely advanced our fruit buds, saved the wheat crop in central Ohio. It is not best to worry much about what we cannot help. Better think of our own mistakes and not repeat them."

Following the address of Mr. Vergon Prof. Lazenby, President of the Society, spoke briey on "Varieties of Apples." E. I. Lichti, one of the horticultural students. took quite a number of photographic views of the home of Mr. Vergon and his famous orchard.

Grape Rot

ARCHIE B. SEASON.

The grape-rot is found in a number of different forms, but when we hear it spoken of we think first of the black, or dry-rot as it was first called, though the later name is seldom used in modern writings. When the disease first made its appearance in Ohio it looked for a time as if it would put a stop to the grape industry, but the final outcome was only a change of locality, the industry having been moved from the banks of the Ohio River to the border of Lake Erie. This would have been but a temporary remedy had it not been for the Bordeaux mixture coming to the rescue of the grape grower.

The earliest writings on the subject date back about the year 1848. The existence of the black-rot in the interior forests of Virginia, and upon most of the wild species of vines of the United States, from the Rocky Mountains, to the Atlantic, and from the Dominion of Canada to the Gulf of Mexico, prove beyond question that the disease is of American origin. Its importation into Europe dates from 1885 when it at once became a serious question in all grape-growing sections. The European vines are much more susceptible to the disease than the American.

The rot occurs on all wild and cultivated vines east of the Rocky Mountains. The only states exempt from the disease are California, Arizona and Southern Texas. It is only a matter of time until it will reach Northern California. The disease is kept from the larger portion of

this section, by the unfavorable climate. For favorable conditions moisture is necessary, and a considerable degree of heat favors the development of the disease. In the most northern districts black-rot although present, does comparatively little or perhaps no direct damage, and in dry regions the disease is light or unknown. Ltaitudes where they have frequent rains, followed by hot, sultry weather, or heavy dews and fogs, with marked changes of temperature between day and night favor the rot. Vines of rank succulent growth and with juicy berries are those which are most subject to the attack of the fungus.

Black-rot has been attributed to the character of the soil, to the atmosphere, to an unfavorable condition of the vines, etc., but it is now known to be solely due to the attack of a plant parasite, a fungus of microscopic size, but no less a plant possessing character of its own, definite as the vine itself.

The habits of the fungus, the manner of its growth, and conditions which favor it or are unfavorable to its development, are now well known, how and when it produces its reproductive bodies or spores, and how these spores come upon the vines, and finlaly how the attacks of the fungus may be prevented.

When the grape is yet only in part destroyed by the rot, little rounded sacks begin to form beneath the skin, which contain the spores of the rot. They may be seen with the naked eye, while studying the surface of the grape, and in this way the black-rot may be distinguished from the brown; for in the latter there are no such developments. Later the sacks open at the top and the spores fall out to be scattered by the wind and rain, each one having the power to produce a new growth of the fungus. In this way the rot is spread throughout this and ajoining vineyards. They possess a high degree of vitality; even when kept thoroughly dry for months they readily germinate if placed in a suitable condition.

When fully matured the black-rot produces spores of another kind. These can be found only in early spring in berries that have been destroyed the year previous, a fact which shows that the fungus retains its vitality in the rotten berries throughout the winter season. It is probable that these spores are especially designed to perpetuate the parasite from year to year, for the fungus evidently dies as soon as its development ceases, and becomes itself pray to other fungi.

The parts of the vines attacked are the green and tender shoots, the leaves and berries. The ravages of the disease appear to the naked eye on the berry as the black-rot and on the leaves as sharply defined, reddish brown spots, and on growing canes as elongated, dark brown or black spots, which are slightly depressed owing to the absorption of the juices from the cells composing the underlying tissues. Usually but little danger results from the attacks made upon the shoots or the leaves; it is only when the berries are attacked that the injury becomes serious. The time from which the fungus first attacks the berries till these begin to show signs of decay is, under ordinary circumstances about eight days. In the last stages of the disease the berries become wholly black and shrivels up into a dry, hard mass, there being little left but the skin and seeds.

In treating the black-rot it seems to be the opinion of all writers that there is nothing better than the Bordeaux mixture for the first sprayings, and ammoniacal solution of copper carbonate for the last two times. The vines should be sprayed from two to five times depending somewhat on the weather. In rainy weather the spray

should be used oftener. The objection to using the Bordeaux mixture for the entire time is that the copper sulphate sticks to the berries, injuring them for market. The first application should be made before the starting of the buds in the spring and the next when the young shoots are from four to twelve inches long.

The Agricultural Society of O. S. U. held their first meeting in Townshend literary room on October 4. Dr. Gay was the speaker of the evening, his subject being "Points to be Considered in the Selection of a Horse." The attendance, though fair, was not what it might have been.

Keep the Boy on the Farm

PROF. A. B. GRAHAM.

Not all boys should be kept on the farm, but the boy who remains there should not be the one, as many who live in the country put it, who will never be fit for anything else but a farmer. Let it be said now that if a boy lacks ability to take up anything else, the man who will make a farmer of him will deserve a crown of glory.

There must be ability to do any kind of work successfully, capacity for receiving the great truths, facts, and principles pertaining to the work and ability to acquire skill in applying knowledge. When such conditions exist in the child, what his vocation will be is largely determined by the interest that will be aroused in him by his parents, by his teacher, by some person whom he thinks of as his ideal, or by some hero. (Boys are great hero worshippers.)

In many homes and schools, children hear of Fairbanks, but not of Burbank; of General Wood, but not of Jethro Wood; of Louisa May Alcott, but not of Bronson Alcott; of Hancock, but not of Babcock; of Reid and Riley, the diplomat and the poet, but not of Reid and Riley, who patiently and with painstak-

Homes made beautiful by the growth of bulbous and other plants.

ing developed excellent corn. Are not those whose names are less familiar as deserving of our consideration for what they have done to contribute to our material wealth and comfort as those whose names are associated with war, statecraft, or letters?

Our schools must afford a greater opportunity for children to become interested in rural life. If all else is lacking, a teacher who has been prepared especially for workin country schools is necessary. If not one who has such a preparation, then one who is making some preparation by means of books, experiments, and investigation.

The opportunity to do, as well as to read, must be presented to the child. Every well-equipped school should have a small space set in fruit trees, berries, spring and fall blooming plants and shrubbery. Such products as corn, garden vegetables, and summer blooming flowers should be raised at home.

By having fruit trees, etc., on a school ground, grafting, budding, spraying, etc., which come within the school term could be taught. The planting of bulbs, tulips, hyacinth, crocuses, and daffodils in the fall for spring blooming, and the planting of canna, dahlia, and tuberose for early fall blooming arouses an interest in beautifying the home yards.

Nothing of any importance concerning the chemical nature of the soils, except acidity, could be taken up in elementary schools, but the physical composition and properties of the soil can be worked out in a very interesting manner. The economic value of birds and insects is as interesting to parents as to children after the child's interest has been aroused.

A boy or girl should have something they can raise at home. Individual ownership sharpens interest. In such work, the simplest kind of record should be kept as a beginning to forming a habit of record keeping. Even though children

Successful growth of corn by a boy scarce y in his teens.

like changes and variety, they should be encouraged to continue at least one kind of experimental work longer than a season or two.

The boy by the plot of corn is now on his third year at corn raising. He has planted, cultivated, husked, weighed, and recorded for three years; he is beginning to be able to draw some conclusions; he is no doubt reading about corn in the little Ohio country school which he attends. The father has become interested in the boy's work and talks with him about it. With such a school, library, teacher, and experimental work as this boy and other boys of the same school have, isn't the problem of keeping on the farm the boy who should remain there partially solved?

Foot Ball Notes

Thus far the 'Varsity team has played six games, and the scores are as follows:

Sept. 23—Otterbein 6, O. S. U. 6.
Sept. 30—Heidelburg 0, O. S. U. 28.
Oct. 4—Muskingum 0, O. S. U. 40.
Oct. 7—Wittenberg 0, O. S. U. 17.
Oct. 14—Denison 0, O. S. U. 6 (forfeited to O. S. U.).
Oct. 21—De Pauw 6; O. S. U. 32.

The Otterbein game came when our men had only a few days' practice, while Otterbein players were working two or three weeks. Wesleyan defeated Otterbein later 33 to 0, while Oberlin beat Wesleyan 17 to 6, and Wittenberg defeated Oberlin 5 to 0. Then the Wittenberg and O. S. U. game resulted 17 to 0 in favor of O. S. U. We can see by the above scores that O. S. U. is rapidly improving and bids well for the State championship this year.

The University of Michigan's team is as strong as ever. The game with Michigan will be played on November 11. The rate to Ann Arbor for that date is $2, round trip.

Consider With Me

BY H. C. RANSOWER.

During the past summer it was the writer's privilege in company with a fellow-student, in pursuance of college work, to traverse a considerable portion of a county in central Ohio and to come in close contact with many of the farmers in that region. Our conversation with them coupled with observation suggested not a few thoughts to our mind to some of which we wish to give expression.

Perhaps the most striking fact to us was the total ignorance of many farmers regarding our College of Agriculture and the work that is being done here. Far too many of them wer enot even aware of the existence of such a school and many others who had heard of the institution had but a vague idea, indeed, of its nature, purpose or scope. Young men were actually surprised when mention of such a school was made and not a little curiosity was manifested as to what would be taught in such a school.

What is true of this particular section of the state is true, I doubt not, of many others. And the question naturally arose, where lies the blame? The fact that even a few farmers of the state are absolutely unaware of the existence of an institution founded more than thirty years ago primarily for their benefit and for the suport of which their lands and property are taxed, is one worthy of more than passing thought. Are the farmers entirely to blame or are we who are most interested in its development and success lacking in the prominence which we give it? Perhaps a little of both. True it is that we farmers are slow in "getting onto" and accepting new ideas but this should only mean those who appreciate the value of such ideas to greater effort to impress them

upon the minds of those whom they concern.

If something concerning the presence of our school here, the work it has done and hopes to do, could be placed in the hands of every farmer of the state untold benefit might arise therefrom. A short time ago we happened upon a man who had learned of our institution incidentally, through the literature that is being distributed by Professor Plumb in his eoffrt to obtain a sheep building for the university. His curiosity aroused he made some investigations and discovered a few facts which lead him to say that when his children grew up he would certainly give them the privilege of attending that school. If such were the incidental result of an effort having a different aim in view, what might be the result of consistent effort toward a desired end? Of course articles appear now and then in certain farm journals which tend to advertise us, if you please, and their influence is widely felt. But, alas, such articles are somewhat like the proverbial hen's teeth, "few and far between."

The Agricultural Student Union has done much in the past few years to relieve the situation and now the Department of Rural School Etension Work will awaken an interest in rural affairs and in our school which has not been felt before. But let each student as he goes here and there about the state lose no opportunity to *proudly* proclaim the work that is being done here and let this not cease until every rural citizen shall at least know something of us even if his interest is not aroused. Do not congratulate yourself that such a state of affairs does not exist in your community until enquiry hsa been extensively made lest, as in our case, you be painfully surprised.

Growth of O. S. U.

On the second day's registration of this year and last the enrollment of the diffierent colleges was as follows:

	1904	1905
Arts	411	441
Agr. and Dom. Science	179	248
Engineering	594	649
Pharmacy	21	42
Law	124	118
Veterinary	75	102
Total	1404	1601

The above figures show an increase in every department except the College of Law, which has a loss of five per cent., while the College of Pharmacy leads with a gain of one hundred per cent., and the Agricultural College second with a gain of nearly thirty-nine per cent.

On October 12 the enrollment in the different classes of the Agricultural College was as follows:

Agricultural, four years:	
Freshman	42
Sophomore	42
Junior	19
Senior	23
Total	126
Agricultural, two years:	
First year	66
Second year	11
Total	77
Horticulture:	
Freshman	8
Sophomore	2
Junior	2
Senior	4
Total	16
Domestic Science, two years:	
First year	8
Second year	1
Total	9
Graduaate Students:	
Agricultural	3
Domestic Science	1
Total	4

On October 14th there were 270 students enrolled in the Agricultural College, while for the whole last year there were

271; on October 14th of last year only 227.

(The following is a letter sent in to Dean Price of the Agricultural College. This is only one of many which reach that department and it will show that there is a demand for agricultural students abroad and also a good price for their labor.—Ed.)

Washington, D. C.
October 2, 1905.

Dear Sir: We have been informed of an opening in the University of Montevideo, Uruguay, South America, for a young man having educational training and other qualifications which will fit him (1) to become professor of agriculture and veterinary science; (2) to build up these departments and manage them in connection with the work in the university, and (3) to teach at least two subjects.

It is desired that those who contemplate making application for this position, send all diplomas, certificates, records of practical eperience, and recommendations directly to the Consulate of Uruguay, 25 Broad St., New York City. This information should be as complete and comprehensive as possible. The position pays $3,591 gold per annum.

Will you kindly bring this matter to the attention of any of your graduates whom you consider fitted for this position.

Very truly yours,
A. C. TRUE,
Director.

Woods for Special Uses

UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE.

The Forest Service has begun a study of woods for special uses, and will this season take up cooperage woods, box and basket woods, and woods for street paving. The assistance of the public in these investigations is earnestly desired, and suggestions concerning any phase of them will be gladly received by the Office of Forest Products, Forest Service, Washington, D. C. The manner in which these woods will be studied is briefly indicated below.

WOODS FOR STREET PAVING.

Paving with wood, in one form or another, has been experimented with in the United States for nearly seventy-five years. The first experience was so unsatisfactory that municipal engineers for a long time looked upon wood pavement with disfavor. It was quiet, cheap, and comfortable, but it soon wore into holes and ruts, and the absorption of street filth rendered it unsanitary, while the wood speedily decayed and had to be replaced. In recent years, however, both knowledge and practice have improved. It has been discovered that, with the right selection and treatment of woods and the right method of laying, wood pavaing can be made successful; that a good pavement, like a good house, must be built on a sound foundation, and that both absorption and decay can be prevented in the wood by proper chemical treatment. Consequently a revival in wood paving has begun, and many of the largest cities are again trying it.

Few people realize the enormous cost and importance of street pavements. Measured by the money invested, street paving is probably the most important of any single class of engineering construction except steam railroads, the amount invested to date being estimated by a competent authority as approximately $515,000,000 for the United States. Wood pavement is now made almost exclusively of one or two of the best construction woods, and if it should become popular the drain upon these woods would be seriously increased.

The Forest Service wishes to ascertain if there are not among the various cheaper and more abundant species some which can by proper treatment be substituted for the more valuable kinds now in use.

This study will involve three principal lines of inquiry.

Theexperience of cities which have wood pavements will be compared as to the kind of wood used, the form of block and the kind of construction, the qualities of the resulting pavement, and the cost.

Laboratory tests will be made, first to determine to what mechanical qualities woods which have given good service seem to owe their success, and then as to what woods among our cheaper varieties either possess or can be given these qualities. The wear to which a pavement is subjected is a very complex one, which it will be difficult even to approximate in laboratory tests. The final test will be actual service, but the laboratory can, at least, give the basis for an intelligent solution in place of an unfounded guess.

Finally, the supply and location of promising substitutes will be considered.

The Forest Service hopes to make its inquiry of direct benefit to the public. It is especially desirous of completing a list of the manufacturers of wood paving in the United States, and would be glad to be advised of any such manufacturer with whom it is not already in communication.

COOPERAGE WOODS.

The cooperage industry is one of the most important branches of forest utilization. According to the twelfth census, the annual value of the staves, hoops, and heads made by the mills is over $20,000,000. It is estimated that more than 300,000 barrels, kegs, tubs, and similar articles are manufactured daily in the United States.

Until a very recent date the woods chiefly used for cooperage were the slow-growing hardwoods such as oak, elm, maple, ash, beech, and birch, but within the last few years cottonwood, poplar, and latterly gum, have been substituted to some extent, owing to the diminishing supply of the species first exploited.

The depletion of the supply of raw material is felt strongly by the manufacturer, who finds it yearly more difficult to obtain good stock. This is especially true for white oak, since the maker of tight cooperage must often refuse stock which a furniture maker would consider first-class material. Two facators have contributed to bring about this condition—first, the increase in the cooperage manufacture, which has developed enormously in the past quarter century; and second, the extremely wasteful methods employed in cutting, which have left the forest in a deplorable condition, and often wasted more material than was used. Cutting for cooperage purposes is far more wasteful than is ordinary lumbering.

The Forest Service in taking up this question aims to make its investigations of practical value to the cooperage industry and its operators. It is planned to bring together information regarding the supply of raw material, and the best methods of manufacture, and the ill effects of wasteful methods on the forest and possible remedies for them. Particular attention will also be given to a study of the properties of woods, with the view of recommending substitutes which are more abundant than the species now used for cooperage.

BOX AND BASKET WOODS.

The amount of wood annually consumed in the United States for packing boxes and baskets can not be given in exact figures, but it is much greater than is generally realized. The State of Michigan alone has 48 box-making establishments with an annual product valued at $2,272,621. Other states have a yet larger output. There is hardly a business in the whole country which would not be

unfavorably affected by a serious shortage in packing-box material.

The growing scarcity and consequent high price of most of the wods now used in this industry make necessary a search for other suitable woods and for means of regulating their supply, in order that the future demand may be met and a reasonable profit be insured to the manufacturer without overtaxing the consumer.

The study made by the Forest Service will include the questions of supply and demand as regards woods now used, the introduction of other woods as possible substitutes for the scarcer species, the demands of the trade, the physical and mechanical properties required in box and basket woods, and the methods of manufacturing them.

VEHICLE AND IMPLEMENT WOODS.

Manufacturers of vehicles and implements are finding that the supply of woods used in their industries is becoming more and more difficult to obtain. The Forest Service has begun a careful investigation of vehicle and implement woods, to secure more complete knowledge as to whether new and more abundant species may not be fitted for use in these important industries.

This study, which will be carried on in the manufacturing establishments, and also in the mills and logging camps which furnish the supply of raw material, will embrace an investigation of the properties of the woods used, the distribution and supply of these woods, and the possibility of replacing them by cheaper and more abundant kinds. After as many of these establishments as possible have been studied, extensive tests will be made on the various woods, to find suitable substitutes.

Need of Good Roads

There has been much agitation in different conventions, institutes, society meetings, etc., for the building of better roads throughout the state. No doubt the establishment of rural mail routes has done much toward showing the need of good roads. Of late the automobile is another factor in getting more people to see where good roads are needed.

The many different kinds of rock crushers show that here is a revolution in the method of road building. The Board of Trustees of the University have voted an appropriation of $525 for the establishing and equipping of a road experimental laboratory to be located in the west end of Brown Hall.

An act by the last legislature provided for an appointment of a highway commissioner who shall superintend the construction and maintenance of highways. It provided also that the commissioner make investigations concerning the physical character of road materials. The apparatus of the Agricultural and Engineering College shall be employed.

Ohio Agricultural Experiment Station

FERTILIZING THE WHEAT CROP.

One of the farms belonging to the Ohio Experiment Station had been rented for many years before it came into possession of the Station, and was reduced to a very low state of productiveness. On this farm a five-year rotation, of corn, oats, wheat, clover and timothy, has been maintained since 1894, the rotation being so planned that each crop is represented every season.

Part of the land in this experiment has had no fertilizer or manure of any description since the test began; another part has had acid phosphate only, used at the rate of 80 pounds per acre each on corn and oats and 160 pounds on wheat, making a total of 320 pounds for each 5-year period. Another part has received the same quantities of acid phosphate,

with 260 pounds of muriate of potash in addition—80 pounds each on corn and oats and 100 pounds on wheat. Still another part has received the same quantities of acid phosphate and muriate of potash, with 400 pounds nitrate of soda—160 pounds each on corn, oats and wheat. The total cost per acre for these different combinations of fertilizing materials for each 5-year period has been as follows:

For acid phosphate alone.....	$ 2 40
For acid phosphate and muriate of potash	8 90
For acid phosphate muriate of potash an nitrate of soda.....	20 90

The average yield of wheat on the unfertilized land for the twelve years, 1894 to 1905, inclusive, has been 8.6 bushels per acre. This yield has been increased by the different fertilizing mixtures to the following 12-year averages:

By acid phosphate alone.....	15.9 bus.
By acid phosphate and muriate of potash	17.5 bus.
By acid phosphate, muriate of potash and nitrate of soda..	24.3 bus.

If we value wheat at oone dollar per bushel, corn at half a dollar, oats at one-third of a dollar, hay at eight dollars per ton, corn stover (fodder) at three dollars and straw at two dollars, the total increase from all the crops for each rotation in this experiment would have the following total and net values, the net value being obtained by deducting the cost of the fertilizer:

	Total	Net
From acid phosphate alone	$16 72	$14 32
From acid phosphate and muriate of potash	24 08	15 18
From acid phosphate, muriate of potash and nitrate of soda..	40 72	19 82

It is apparent that on this worn soil the complete fertilizer, containing nitrogen and potassium as well as phosphorus, has produced by far the most profitable increase of crop, although the cost of this fertilizer has been more than eight times as great as that of acid phosphate alone.

In another experiment on this same farm corn, wheat and clover have been grown in a 3-year rotation since 1897. Part of the land in this test has received neither manure nor fertilizer, while a part has been manured for the corn crop with cattle manure, used in all cases at the rate of 8 tons per acre and plowed under, the corn being followed by wheat and clover without further manuring or fertilizing. Part of this manure has been taken from an open barnyard, where it has lain during the winter; part has been allowed to accumulate under the feet of the cattle in their stalls until it could be hauled directly to the field, and with a third part—also stall manure—acid phosphate has been incorporated during accumulation, the phosphate being used at the rate of 40 pounds per ton of manure, or 320 pounds per acre.

In this test the unmanured land has produced an average yield of 8.9 bushels of wheat per acre; the yard manure has increased the average yield to 16.3 bushels, the untreated stall manure to 17.9 bushels, and the phosphated stall manure to 24.2 bushels.

Taking all the crops of the rotation, and estimating their value as before, the total value of the increase from each method of treatment has been as below:

From 8 tons yard manure, untreated	$20 35
From 8 tons stall manure, un treated	27 58
From 8 tons stall manure, phosphated	44 35

The nitrate of soda and muriate of potash used in the first experiment have cost $18.50 per acre for each rotation, and have been paid for with a large

profit besides, in the increase of crop; but the 8 tons of stable manure, used in connection with the same quantity of acid phosphate, has produced a much greater increase of crop than these expensive chemicals.

These experiments demonstrate the vast importance of furnishing the wheat crop with an abundant supply of nitrogen and potash, as well as of phosphorus, when it is grown on worn land, and show that in farm manure we have a most effective source of nitrogen and potash, the value of which may be more than doubled by protection from the weather and reenforcement with phosphorus.

Agricultural News

BY N. E. SHAW.

The official crop bulletin states that an exceptionally large and fine yield of corn is now assured and only a small part remains exposed. A light apple crop is reported nearly everywhere. Owing to blight and rot a light and inferior crop of potatoes is everywhere promised.

An order creating a new forest reserve in Utah embracing nearly 500,000 acres, has been signed by President Roosevelt. The Minnesota National Forest Reserve, when completed, will contain 225,000 acres of land.

The 29th biennial meeting of the American Pomological Society was held in Kansas City, September 18-21. More than two hundred members and delegates were present. Sixteen hundred plates of fine fruit were exhibited representing all sections of the United States. L. A. Godman of Missouri, was elected president of the society, and T. V. Munson of Texas, was elected vice president. Prof. Lazenby of Ohio State, was a delegate from the Columbus Horticultural Society, and was elected vice president for Ohio.

During the last week of September, 187,780 head of sheep were marketed in Chicago. This beats all previous records for a week by 5000 head.

D. Ward King's system of road making is steadily increasing in popularity in Missouri and adjoining states. In the little town of Onawa, Iowa, three hundred farmers gathered to hear Mr. King talk from his special train. Business men of the towns subscribed one hundred and fifty dollars to be given in prizes to the best kept mile and half-mile road by use of the King drag. Within one week fifty farmers were using homemade King drags and it is estimated that 200 will be using them this fall. This is only an example of what is being done along the line in many Iowa and Missouri towns.

A national apple day has been fixed by general consent to be observed annually on the third Tuesday of October. The motion for this event was made by the New York State Fruit Growers' Society last January and was approved by many horticultural societies, the National League of Commission Men and the International Apple Shippers' Association. It was also approved by the recent meeting of the American Pomological Society. By making a general diet of apples on this day it is thought that it will create a direct demand on that day for one-half million barrels of apples and be followed by a more general use of apples on family tables.

A party of students in Animal Husbandry will take a trip in the near future to Mr. Dan W. Black's place at Lyndon, O., to inspect his car load of cattle,

which are to be shown at the next International. These are range Hereford cattle from the Adair ranch, Texas.

The library has recently received a complete set of Coate's Shorthorn Herd Books of Great Britain, including first and third volumes of the original edition which have marginal notes by former owner. The first volume was published in 1822. Fifty volumes have been published since, thus making the complete set cost $200 to non-members, although the Short Horn Association of Great Britain made a special price to the University.

Alumni Notes

Mr. E. E. Finney has severed his connection with the herd of Mr. Victor Faulkenau, of Benton Harbor, Mich., where he has been employed for the past summer. This was due to the dispersal sale of Mr. Faulkenau's herd of Red Polls.

Theron Rose, student of last year's dairy class, has a position with Mr. Charles Ziniag, of Lime City, O., Wood county, where he will operate a fancy butter making station. The products go to the Toledo market.

R. L. Fromme, '05, and Charles H. Flory, of '05 class in Horticulture and Forestry, are in Yale School of Forestry.

E. C. Cotton, class of '05, Horticulture and Forestry, is now in the employ of the State Orchard and Nursey Inspection Bureau.

I. J. Condit, '05, Horticulture and Forestry, is now florist at the O. S. U.

Mr. Guthrie was at Lancaster fair last week testing milk and scoring butter. The week before he was at Centervillage talking to the people, giving them some practical hints on butter making and caring for milk. There is a skimming station at that place.

Walter Florence, ex-'06, is managing his father's farm, five miles north of Plain City.

La Motte Ruhlin, '02, is in Colorado at present on account of poor health.

Frank Ruhlen, '96, and former Assistant in Agriculture, is running a farm which is located a few miles north of Plain City.

L. M. Smith, '05, Horticulture and Forestry, is in the employ of the Orchard and Nrsery Inspection Bureau with headquarters in Columbus, O.

Robert Allen, '04, is located in Gowanda, N. Y., where he is cheesmaker for a concern in that place.

E. M. Armstrong, '00, is located near Zanesville, O., where he is farming.

J. D. Adcock, '00, whose address is Ridgeway, O., is running a stock farm near that place.

H. A. Clark, '02, B. Sc. (H. and F.), who has for some time past been in the employ of the Bureau of Plant Industry, Agr. Dept., Washington, D. C., is now at his home on the farm. His address is Medina, O., R. R. 4.

An Interesting Publication

Prof. Lazenby has recently received a new book, written by William P. Bentley of the class of 1885, and published in the Chinese language.

The title of the book is "Brief Lives of the American Presidents and Selections From Their Words of Wisdom," and it is published by the Society for

the diffusion of Christian and general knowledge among the Chinese. It is a good-sized volume, neatly bound in leather and illustrated by fine engravings of the capitol at Washington and the White House, and full page portraits of each of the Presidents from George Washington to Theodore Roosevelt, inclusive. Rev. Bentley has the distinction of being the first graduate in agriculture of the State University. He is now a well-known missionary, teacher and author, with headquarters at Shanghai, China. Among his publications in Chinese is one on Agricultural Chemistry.

Columbus, Ohio, October 14, 1905.

Dear Sirs: The American Royal held in Kansas City this week has been as great a show as it is possible to be and it is gratifying to report that in the Percheron and French Coach Stallion classes we won Every First Prize.

We exhibited our stallions in twenty-two rings and won twenty-two First Prizes, including Championships. Thursday afternoon we showed our horses before an audience of seven thousand people and Friday night there were about eight thousand.

Nothing but horses were shown to this great audience Friday night and the enthusiasm of the crowd, when the grand prize winners were brought out, was without bounds.

Yours very truly
McLAUGHLIN BROS.

New Books

THE CHRYSANTHEMUM—Its Culture for Professional Growers and Amateurs. By Arthur Herrington.

The most complete and comprehensive work on the cultivation of the chrysanthemum that has yet been published in America. Its scope and character may be gleaned from the list of contents, which comprises chapters on culture for exhibition; composts; planting; benches, boxes or pots; general cultural details; crown and terminal buds; feeding, its object and application; care of the buds; exhibition and judging; specimen plants, chrysanthemum plants in six-inch pots; commercial culture raising from seed and hybridizing; sports, hardy chrysanthemums; chrysanthemums for south and west; chrysanthemums in Australia; insect pests and diseases; classification and selection of varieties for special purposes; and history of the chrysanthemum. The book will be welcomed both by the professional and amateur growers of chrysanthemums, for the lucid, comprehensive as well as the practical character of its contents, which, if strictly followed, cannot fail to bring about the desired results, namely, the obtaining of large chrysanthemum flowers in the greenhouse, and a profusion of bloom in the garden. Handsomely illustrated. 168 pages. 5x7 inches. Price 50c. Orange Judd Company, 52 Lafayette Place, New York. Marquette Bldg., Chicago.

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SOIL PHYSICS AND LABORATORY GUIDE—By W. H. Stevenson, A. B. B. S. A., Professor of Soils, Iowa State College, and I. O. Schaub, B. S., Assistant Professor of Soils, Iowa State College, is out. Profusely illustrated, about 100 pages. Cloth. Price 50 cents. Orange Judd Company, New York.

Commendable progress has been made during the past decade in teaching soil physics in the agricultural colleges and high schools of this country. Up to the present time no comprehensive text-book has been prepared on soil physics, while there is at present a widespread demand for a text-book which covers the various phases of the subject. In this work the aim of the authors has been to present to the instructor and the student a care-

fully outlined series of experiments in soil physics. A portion of the experiments outlined in this guide have been used quite generally in recent years. Many of them are now presented for class work for the first time.

The exercises (of which there are 40) are listed in a logical order with reference to their relation to each other and the skill required on the part of the student. Some of the most important of these exercises are: Microscopic study of soil particles, Taking soil samples, Determination of capillary moisture, Influence of evaporation on soil temperature, Effect of rolling upon soil temperature, Influence of color on soil temperature, Influence of vegetation on soil temperature, Variation in soil temperature at different depths. The absorption of heat by soils, The effect of lime upon clay soil, Determination of the specific gravity of soils, Determination of the weight of soil per acre, Effect of humus on the water-holding capacity of soils, Rate of rise of capillary water in soils, The effect of mulches on evaporation of water from soils, The effect of organic matter on baking of clay soils, Mechanical analysis of soils.

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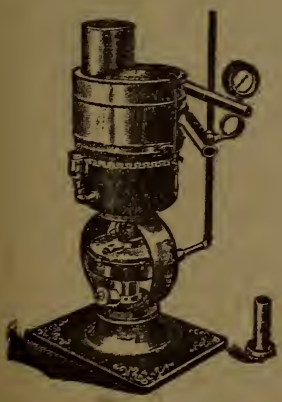

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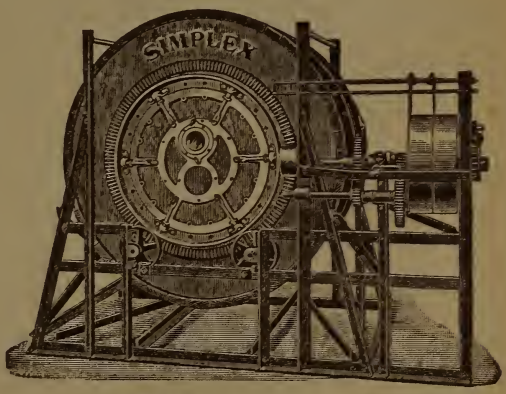

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